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R HAFERKAMP
HOWELL & HAFERKAMP LC
7733 FORSYTH BOULEVARD
SUITE 1400
ST. LOUIS MO 63105

EXAMINER	
PEREZ, W	
ART UNIT	**PAPER NUMBER**
2834	

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Please find below and/or attached an Office communication concerning this application or proceeding.

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1- File Copy

Office Action Summary	Application No.	Applicant(s)	
	09/453,722	HAINDL, HANS	
	Examiner	Art Unit	
	Guillermo Perez	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

1)☒ Responsive to communication(s) filed on *03 August 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☐ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1-5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu (U. S. Pat. No. 4, 656, 381) in view of Atsumi et al. (U. S. Pat. No. 5, 113, 107).

Komatsu discloses a claw pole type actuator of a single-phase structure (figure 25), comprising:

a stator yoke composed of a pair of substantially circular planar yokes (112, 115) formed of a soft magnetic material, a number N of polar teeth (113, 114, 116, 117) which axially protrude from inner peripheral edges of the respective planar yokes and which are disposed to face each other extending in an axial direction, and a cylindrical ring (112b, 115b) provided on outer peripheral edges of one of said planar yokes;

a rotor (110) being concentrically disposed within the stator yoke having a number N of magnetic poles:

an armature (120) being constituted by installing a coil (119) formed by winding a magnetic wire (118) in a coil receiving section shaped like an annular recess formed by said planar yokes, said polar teeth, and said cylindrical ring of said stator yoke; and

a stator assembly which has flanges (121, 122) with bearing provided on both end surfaces of said armature and in which a rotor provided with a magnet for a

magnetic field composed of a permanent magnet being installed to face said polar teeth of said stator with a minute gap provided therebetween; wherein

a number of said polar teeth equals the number N of rotor magnetic poles (figure 26); and that

said stator yoke is comprised of a first stator yoke in which a planar yoke and a polar tooth are combined into one piece, and a second stator yoke in which a planar yoke, a polar tooth and a cylindrical ring are combined into one piece, and said polar teeth of said first and second stator yokes, respectively, are disposed at a spacing of approximately 180 degrees in terms of an electrical angle;

a pair of stator yokes, each being composed of said planar yoke and said cylindrical ring that are combined into one piece, are disposed to face each other;

said flanges are composed of a nonmagnetic material (column 11, lines 64-65). However, Komatsu does not disclose a rotor being adapted to repetitive rotational movement within a set angular range; nor a rotation of said rotor being restricted by a stopper so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees; nor that said stopper is incorporated in said actuator.

Atsumi et al. disclose a rotor (42 in figure 4) being adapted to repetitive rotational movement within a set angular range (figure 2 and column 4, lines 11-17); and that a rotation of said rotor is restricted by a stopper (7) so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees (column 1, lines 9-13 and column 4, lines 12-17); and that said stopper is incorporated in said actuator, for the

purpose of limiting the rotation to a limited angular range in a clockwise and counterclockwise direction.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of a single-phase structure of Komatsu and provide it with a rotor being adapted to repetitive rotational movement within a set angular range; and a rotation of the rotor being restricted by a stopper so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees; the stopper being incorporated in said actuator as disclosed by Atsumi et al., for the purpose of limiting the rotation to a limited angular range in a clockwise and counterclockwise direction.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to restrict the rotation of the rotor to a range of 120/N to 240/N degrees, since it has been held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller,* 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. as applied to claim 1 above, and further in view of Yamaguchi et al. (U.S. Pat. No. 5, 373, 207).

Komatsu and Atsumi et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Atsumi et al. disclose a groove or a cut for destroying magnetic balance is provided in an axial direction on a central portion of one of south pole and north pole of said magnet for magnetic field.

Yamaguchi et al. disclose a groove or a cut (figure 9) for destroying magnetic balance is provided in an axial direction on a central portion of one of south pole and north pole of said magnet for magnetic field, for the purpose of providing a motor without an output shaft nor external eccentric weight.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Atsumi et al. and provide it with a groove or a cut for destroying magnetic balance being provided in an axial direction on a central portion of one of south pole and north pole of said magnet for magnetic field as disclosed by Yamaguchi et al., for the purpose of providing a motor without an output shaft nor external eccentric weight.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. as applied to claim 1 above, and further in view of Haydon et al. (U. S. Pat. No. 4, 274, 026).

Komatsu and Atsumi et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Atsumi et al. disclose that extensions of said two polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle.

Haydon et al. disclose that extensions of said two polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle (figures 12-13 and column 9, lines 14-19), for the purpose of improving the net usable torque of the rotor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Atsumi et al. and provide it with extensions of the two polar teeth in a circumferential direction being all the same and staying within a range of 220/N to 260/N degrees at central angle as disclosed by Haydon et al., for the purpose of improving the net usable torque of the rotor.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. as applied to claim 1 above, and further in view of Morril (U.S. Pat. No. 5, 260, 620).

Komatsu and Atsumi et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Atsumi et al. disclose that air gaps in a radial direction formed by said polar teeth and said rotor magnet are uneven, nor that air gaps at central portions of said polar teeth are narrower than air gaps at ends of said polar teeth.

Morril discloses air gaps (figure 5) in a radial direction formed by said polar teeth (16) and said rotor magnet are uneven, and air gaps at central portions of said polar teeth are narrower than air gaps at ends of said polar teeth, for the purpose of improving torque, speed and efficiency in the motor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Atsumi et al. and provide it with air gaps in a radial direction formed by said polar teeth and said rotor magnet being uneven, and air gaps at central portions of said polar teeth being narrower than air gaps at ends of said

polar teeth as disclosed by Morril, for the purpose of improving torque, speed and efficiency in the motor.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. as applied to claim 1 above, and further in view of Horst (U. S. Pat. No. 5, 122, 697).

Komatsu and Atsumi et al. disclose a claw pole type actuator as described on item 1 above. However, Komatsu nor Atsumi et al. disclose that a relationship between a detent torque T_d (Nm) and a rated torque T_{rate} (Nm) is as follows: $T_{rate}/4 \leq T_d \leq 3\,T_{rate}/4$; where T_{rate} denotes a maximum torque value obtained when a rated current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode.

Horst discloses that a relationship between a detent torque T_d (Nm) and a rated torque T_{rate} (Nm) is as follows:

$T_{rate}/4 \leq T_d \leq 3\,T_{rate}/4$

where T_{rate} denotes a maximum torque value obtained when a rated current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode (figure 2 and column 5, lines 1-26), for the purpose of providing rotor torque when the coil-excited reluctance torque is zero or negligible.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu and Atsumi et al. and provide it with a relationship between a detent torque T_d (Nm) and a rated torque T_{rate} (Nm) being as follows: $T_{rate}/4 \leq Td \leq 3\,T_{rate}/4$; where T_{rate} denotes a maximum torque value obtained when a rated

current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode as disclosed by Horst, for the purpose of providing rotor torque when the coil-excited reluctance torque is zero or negligible.

6. Claims 11-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Haydon et al. and further of Horst in view of Atsumi et al.

Komatsu discloses a claw type actuator of a single-phase structure, comprising:

a stator yoke composed of a pair of substantially circular planar yokes formed of a soft magnetic material,

polar teeth which axially protrude from inner peripheral edges of the respective planar yokes and which are disposed to face each other extending in an axial direction, and

a cylindrical ring provided on outer peripheral edges of one of said planar yokes;

an armature being constituted by installing a coil formed by winding a magnet wire in a coil receiving section shaped like an annular recess formed by said planar yokes, said polar teeth, and said cylindrical ring of said stator yokes; and

a stator assembly which has flanges with bearings provided on both end surfaces of said armature and in which a rotor provided with a magnet for a magnetic field composed of a permanent magnet being installed to face said polar teeth of said stator with a minute gap provided therebetween;

wherein a number of said polar teeth equals a number N of rotor magnetic poles,

said polar teeth of said first and second stator yokes, respectively, are disposed at a spacing of approximately 180 degrees in terms of an electrical angle; and that

said stator yoke is comprised of a first stator yoke in which a planar yoke and a polar tooth are combined into one piece, and a second stator yoke in which a planar yoke, a polar tooth and a cylindrical ring are combined into one piece; and

a pair of stator yokes, each being composed of said planar yoke and said cylindrical ring that are combined into one piece, are disposed to face each other; and that

said flanges are composed of a nonmagnetic material. However, Komatsu does not disclose that an extension of said two polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle; nor that a relationship between a detent torque T_d (Nm) and a rated torque T_{rate}, (Nm) is as follows: $T_{rate}/4 \leq T_d \leq 8T_{rate}/4$ where T_{rate} denotes a maximum torque value obtained when a rated current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode; nor that a rotation of said rotor is restricted by a stopper so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees; nor that said stopper is incorporated in said actuator.

Haydon et al. disclose that an extension of said two polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle, for the purpose of improving the net usable torque of the rotor.

Horst discloses that a relationship between a detent torque T_d (Nm) and a rated torque T_{rate}, (Nm) is as follows:

$$T_{rate}/4 \leq T_d \leq 8T_{rate}/4$$

where T_{rate} denotes a maximum torque value obtained when a rated current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode, for the purpose of providing rotor torque when the coil-excited reluctance torque is zero or negligible.

Atsumi et al. disclose that a rotation of said rotor is restricted by a stopper so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees; and that

said stopper is incorporated in said actuator, for the purpose of limiting the rotation to a limited angular range in a clockwise and counterclockwise direction.

It would have been obvious at the time the invention was made to modify the claw type actuator of a single-phase structure of Komatsu and provide it with an extension of said two polar teeth in a circumferential direction being all the same and staying within a range of 220/N to 260/N degrees at central angle as disclosed by Haydon et al.; and a relationship between a detent torque T_d (Nm) and a rated torque T_{rate}, (Nm) being as follows: $T_{rate}/4 \leq T_d \leq 8T_{rate}/4$; where T_{rate} denotes a maximum torque value obtained when a rated current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode as disclosed by Horst; and a rotation of the rotor being restricted by a stopper so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees as disclosed by Atsumi et al., for the purpose of improving the net usable torque of the rotor, providing rotor torque when the coil-excited reluctance torque is zero or negligible and limiting the rotation to a limited angular range in a clockwise and counterclockwise direction.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Haydon et al. and further of Horst in view of Atsumi et al. as applied to claim 11 above, and further in view of Yamaguchi et al.

Komatsu, Haydon et al., Horst and Atsumi et al. disclose a claw type actuator of a single-phase structure as described on item 6 above. However, neither Komatsu, Haydon et al., Horst nor Atsumi et al. disclose that a cut for destroying magnetic balance is provided in an axial direction on a central portion of one of a south pole and a north pole of said magnet for magnetic field.

Yamaguchi et al. disclose that a cut for destroying magnetic balance is provided in an axial direction on a central portion of one of a south pole and a north pole of said magnet for magnetic field, for the purpose of providing a motor without an output shaft nor external eccentric weight.

It would have been obvious at the time the invention was made to modify the claw type actuator of a single-phase structure of Komatsu, Haydon et al., Horst and Atsumi et al. and provide it with a cut for destroying magnetic balance being provided in an axial direction on a central portion of one of a south pole and a north pole of said magnet for magnetic field as disclosed by Yamaguchi et al., for the purpose of providing a motor without an output shaft nor external eccentric weight.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Haydon et al. and further of Horst in view of Atsumi et al. as applied to claim 1 above, and further in view of Morril.

Komatsu, Haydon et al., Horst and Atsumi et al. disclose a claw type actuator of a single-phase structure as described on item 6 above. However, neither Komatsu, Haydon et al., Horst nor Atsumi et al. disclose that air gaps in a radial direction formed by said polar teeth and said rotor magnet are uneven, nor that air gaps at central portions of said polar teeth are narrower than air gaps at ends of said polar teeth.

Morril discloses that air gaps in a radial direction formed by said polar teeth and said rotor magnet are uneven, and air gaps at central portions of said polar teeth are narrower than air gaps at ends of said polar teeth, for the purpose of improving torque, speed and efficiency in the motor.

It would have been obvious at the time the invention was made to modify the claw type actuator of a single-phase structure of Komatsu, Haydon et al., Horst and Atsumi et al. and provide it with air gaps in a radial direction formed by the polar teeth and the rotor magnet being uneven, and air gaps at central portions of the polar teeth being narrower than air gaps at ends of the polar teeth as disclosed by Morril, for the purpose of improving torque, speed and efficiency in the motor.

Response to Arguments

Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Refer to the Notice of References Attached for other art related to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Perez whose telephone number is (703) 306-5443. The examiner can normally be reached on Monday through Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308 1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3432 for regular communications and (703) 305 3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

Guillermo Perez
October 22, 2000

NESTOR RAMIREZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800